

1. (currently amended) A method of creating a transparent permeable contact lens from a mat of polymer material formed of strands that exhibits the transparency and diffusion characteristics of corneal stromal tissue using the process of electrospinning, comprising
- 5 the steps of:
- a. providing a power supply having an alternating output voltage adjustable over a range extending from 4,000 to 12,000 volts, the power supply providing its output to a first and second terminal,
 - b. providing a conductive target having a surface on which to form a base
 - 10 surface (a cornea contact surface) of the contact lens, and a needle having a needle tip,
 - c. electrically coupling the target to the power supply first terminal and the needle to the power supply second terminal to permit the power supply to provide an electric field between the target and the needle tip,
 - d. dissolving a polymer solute in a suitable solvent,
 - 15 e. delivering said solute and solvent solution to the needle tip at a controlled pressure,
 - f. adjusting the output voltage of the power supply to increase the electric field between the needle tip and target until a Taylor cone is formed, but not of a magnitude to result in a corona discharge or coronal effect,
 - 20 g. providing a means to vary the source to target distance,
 - h. moving the needle in a linear direction for a fixed distance and then reversing such motion with respect to the target while at the same time indexing the target utilizing a precision positioner to obtain a desired pattern, and when the desired pattern has been achieved in one axis, the target is rotated ninety degrees and the
 - 25 process repeated, to provide the desired patterns over a region of the target exceeding the perimeter of the contact lens to be formed, depositing the electrospun material as a mat, and
 - i. alternating the polarity of the output voltage of the power supply between the target and the needle tip to prevent charge buildup on electrospun fibers
 - 30 and to permit the deposition of electrospun fibers to enable the construction of an electrospun mat of polymer fibers forming the transparent permeable contact lens,

_____j. _____trimming the desired patterns over the region of the target exceeding the
perimeter of the contact lens to be formed to obtain the lens desired.”.

5 2. (previously presented) A method as in claim 1 where the needle is solid.

3. (previously presented) A method as in claim 1 where the needle is hollow.

4. (previously presented) A method as in claim 1 where the needle is a holey fiber.

10 5. (previously presented) A method as in claim 1 where the needle is a micro
electro mechanical structure device.

15 6. (previously presented) The method of claim 1 at step h of moving the needle in
patterns over a region of the target that exceeds the perimeter of the contact lens to be
formed further comprises the step of:

controlling the potential during the electrospinning process to maintain a mean
fibril distance of approximately 200 nm.

20 7 (previously presented) The method of claim 1 wherein step f further comprises:
adjusting the electric field between the target and the needle tip, the controlled pressure
applied to the solute and solvent solution in the needle, and the material temperature to
control flow rate of the material onto the mat being formed on the target, the ambient
temperature and the distance traveled across the lens region on the target and the gap
between the needle tip and the target, to adjust the diameter of the fibers being
25 deposited, the contact lens having an optical transparency that is adjusted by controlling
the diameter of the collagen fibers being deposited.

30 8. (previously presented) The method of claim 1 further comprising the step of
modifying step a for providing a power supply having an alternating output voltage
adjustable over a range extending from 4,000 to 12,000 volts to be a step of providing a
high voltage dc power supply providing its output to a first and second terminal and

connecting the output terminals to the power supply output through a switching means for reversing the polarity of the output terminals at high frequency.

9. (previously presented) The method of claim 1 further comprising the step of
5 modifying step a for providing a power supply for having an alternating output voltage adjustable over a range extending from 4,000 to 12,000 volts to be a step of providing a high voltage ac power supply to output terminals.

10. (canceled)

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11. (currently amended) The method of claim 1 wherein step d further comprises the step of dissolving a polymer of fiber materials selected from the group consisting of [[comprising]] collagen~~[[, or]]~~ and HEMA.

15 12. (canceled)

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13. (currently amended) A method of creating a transparent permeable contact lens from a mat of polymer material formed of strands that exhibits the transparency and diffusion characteristics of corneal stromal tissue using the process of electro spinning, comprising the steps of:
- a. providing a power supply having an alternating output voltage adjustable over a range extending from 4,000 to 12,000 volts, the power supply providing its output to a first and second terminal,
 - b. providing a conductive target having a surface on which to form a base surface (a cornea contact surface) of the contact lens, and a needle having needle tip,
 - c. electrically coupling the target to the power supply first terminal and the needle to the power supply second terminal to permit the power supply to provide an electric field between the target and the needle,
 - d. dissolving a polymer solute in a suitable solvent,
 - e. delivering said solute and solvent solution to the needle tip,
 - f. adjusting the output voltage of the power supply to increase the electric field between the needle tip and target until a Taylor Cone is formed,
 - g. providing a means to vary the source to target distance,
 - h. moving the target with respect to the needle in a linear direction for a fixed distance and then reversing such motion with respect to the target while at the same time indexing the target utilizing a precision positioner, and when a desired pattern has been achieved in one axis, the target is rotated ninety degrees and the process repeated, to provide desired patterns forming the contact lens to be formed and controlling the potential during the electrospinning process to maintain a desired mean fibril distance [.] and,
 - i. alternating the polarity of the output voltage of the power supply between the target and the needle tip to prevent charge buildup on electrospun fibers and to permit the deposition of electrospun fibers at precise intervals to enable the construction of a precise electrospun mat of polymer fibers.

14. (currently amended) A method of creating a transparent permeable contact lens from a mat of polymer material formed of strands that exhibits the transparency and diffusion characteristics of corneal stromal tissue using the process of electrospinning, comprising the steps of:
- a. providing a power supply for having an alternating output voltage adjustable over a range extending from 4,000 to 12,000 volts, the power supply providing its output to a first and second terminal,
 - b. providing a conductive target having a surface on which to form a base surface (a cornea contact surface) of the contact lens, and a needle having a needle tip,
 - c. electrically coupling the target to the power supply first terminal and the needle to the power supply second terminal to permit the power supply to provide an electric field between the target and the needle at a fixed distance from the target,
 - d. dissolving a polymer solute in a suitable solvent
 - e. delivering said solute and solvent solution to the needle tip
 - f. adjusting the output voltage of the power supply to increase the electric field between said needle and target until an electrospinning cone is formed launching a spray of solute and solvent solution to the target, the voltage being adjusted to a magnitude that does not result in a corona discharge or coronal effect,
 - g. providing a means to vary the source to target distance,
 - h. moving the needle in a linear direction for a fixed distance and then reversing such motion with respect to the target while at the same time indexing the target utilizing a precision positioner and when a desired pattern has been achieved in one axis, the target is rotated ninety degrees and the process repeated, to provide desired patterns over a region of the target exceeding the perimeter of the contact lens to be formed and controlling the potential during the electrospinning process to maintain a desired mean fibril distance of approximately 200 nm, and
 - i. alternating the polarity of the output voltage of the power supply between the target and the needle to prevent preventing charge buildup on electrospun fibers and to permit the deposit of electrospun fibers at intervals to enable the construction of a electrospun mat of polymer fibers,

j. adjusting the electric field between the target and the needle and the pressure applied to the dissolved polymer solute in the needle tip to control flow rate of the material onto the mat being formed on the target, the contact lens having an optical transparency that is adjusted by controlling the diameter of the collagen fibers and the spacing of the collagen fibers being deposited,

k. trimming the desired patterns over the region of the target exceeding the perimeter of the contact lens to be formed to obtain the lens desired.

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15. (previously presented) The method of creating a contact lens from a mat of polymer material of claim 13 further comprising:

providing a source of free ions and directing the free ions to the Taylor Cone in step f to further reduce a charge induced whipping of the spray of solute and solvent solution moving to the target.

16. (previously presented) The method of creating a contact lens from a mat of polymer material of claim 14 further comprising:

providing a source of free ions and directing the free ions to the electrospinning cone in step f to further reduce charge induced whipping of the spray of solute and solvent solution moving to the target.

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